

### Abstract

The present invention relates to a catalyst for polymerization and co-polymerization of ethylene. More particularly, the present invention relates to a solid titanium catalyst containing magnesium, wherein said catalyst is produced by preparing a magnesium solution by contact-  
5 reacting a halogenated magnesium compound with alcohol; reacting said solution with an ester compound having at least one hydroxy group, or a phosphorous compound and a silicon compound having alkoxy groups; producing a solid component with an adjusted particle morphology by adding a mixture of a titanium compound and a silicon compound; reacting the same with an aluminum compound; and then reacting the same with a titanium compound, or a  
10 titanium compound and a vanadium compound. As a result, the catalyst of the present invention has high catalytic activity with excellent catalyst morphology.